Remarks

The Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

Claims 67-132 are pending. Claims 1-66 have been canceled without prejudice.

In the Office action, the Examiner rejects claims 67-77, 80, 82-84, 89, 92-96, 99, 100, 102, 103, 105, 108, 109, 112, 113, 115, 121, 122, 125 and 128-132 under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 5,933,451 to Ozkan et al. ("Ozkan"). The Examiner rejects claims 79, 81, 85-88, 90, 91, 97, 101, 104, 106, 107, 110, 114, 116, 124, 126 and 127 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan. The Examiner rejects claims 117-120 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan in view of U.S. Patent No. 5,541,852 to Eyuboglu et al. ("Eyuboglu"). Finally, the Examiner rejects claims 78, 98, 111 and 123 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan in view of U.S. Patent No. 6,873,629 to Morris et al. ("Morris"). The Applicants respectfully disagree with the rejections of the claims.

I. <u>Ozkan.</u>

In the interest of reaching a shared understanding of the disclosure of Ozkan, the Applicants make the following observations.

In Ozkan, a multiplexer system (*see* Figure 1) includes input terminals 5 for different channels of video, and each of the input terminals 5 is coupled to a channel processor 10. (Ozkan, 2:57-3:6, Figure 1.) Each processor 10 includes a complexity output (coupled to a complexity input of the bit rate allocator 30) and a control input (coupled to a "quota" control output of the bit rate allocator 30). (Ozkan, 3:14-21, Figure 2.) Each processor 10 also includes a complexity analyzer 16, and the output of the complexity analyzer 16 (as the output of the processor 10) is the corresponding input of the bit rate allocator 30. (Ozkan, 3:48-62, Figure 2.) Each processor 10 includes a constant bit rate encoder 14, and the control input of the processor 10 is input to the encoder 14. (Ozkan, 3:48-62, Figure 2.) Each encoder 14 encodes video for a given period (e.g., 12 pictures) at a bit rate determined by the signal at its control input. (Ozkan, 3:48-62, 4:63-5:8.)

So, the bit rate allocator 30 receives complexity inputs from the respective complexity analyzers 16 of processors 10 for different channels, and the bit rate allocator 30 produces quota

control outputs to the respective encoders 14 of processors 10 for different channels. (Ozkan, 3:48-62, 5:53-6:29.) Using the complexity inputs, a component of the bit rate allocator 30 "determines the quota of bits for the next quota period for each of the encoders, and supplies signals representing those quotas to the plurality 10 of channel processors via the QUOTA output terminals at the next quota period." (Ozkan, 6:26-29; *see also* 4:63-5:8.)

Much of Ozkan is devoted to describing encoder-side decisions concerning how to allocate bits across different video channels over a quota period. (*See, e.g.*, Ozkan, 3:22-46, 8:63-9:36.) R^i indicates the number of bits allocated to a video channel i over a quota period. (*Id.*) When a video channel has more complex content, relatively more bits are allocated to that video channel, with fewer bits allocated to other video channels. (*Id.*) When a video channel has less complex content, relatively fewer bits are allocated to that video channel, with more bits allocated to other video channels. (*Id.*) In this way, bits of an overall budget R are generally allocated to different video channels over the quota period depending on video complexity.

Ozkan describes refining allocations in various situations. For example, Ozkan describes setting a minimum bit rate allocation for a channel: (a) to prevent quality from dropping "precipitously" (Ozkan, 9:27-29), (b) to account for the possible complexity of scene changes (Ozkan, 9:29-36), or (c) to match a minimum imposed by the operator of a transmission link (Ozkan, 10:34-37). As other examples, Ozkan describes setting a maximum bit rate allocation for a channel: (d) to match a point at which "no improvement in the quality of the reproduced image is visible," or (e) to match a maximum imposed by the operator of a transmission link. (Ozkan, 10:27-37.)

Ozkan describes further refining allocated bit rates to provide buffer management, for example, to ensure that input buffers of receiver decoders do not overflow or underflow. (Ozkan, 10:54-11:57.) Ozkan indicates a decoder buffer size D is "fixed." (Ozkan, 10:62.) According to Ozkan, if an encoder buffer size is capped, the bit rate allocation R^i for a video channel can vary between a minimum bit rate allocation R_{min} for the video channel and a maximum bit rate allocation R_{max} for the video channel without inducing underflow or overflow. (Ozkan, 10:62-67.) Ozkan then describes how this constraint on encoder buffer size can be relaxed, loosening constraints on maximum and minimum bit rate allocations. (Ozkan, 11:5-12:44.)

II. Claims 67-132 Should Be Allowable.

The Applicants have made editorial amendments to independent claims 67, 92, 108, 117, 121, 128 and 132. The application as filed supports the amendments at, for example, pages 1, 11, 15-16, 18 and 19.

A. Claims 67-77, 80, 82-84, 89, 92-96, 99, 100, 102, 103, 105, 108, 109, 112, 113, 115, 121, 122, 125 and 128-132.

In the Office action, the Examiner rejects claims 67-77, 80, 82-84, 89, 92-96, 99, 100, 102, 103, 105, 108, 109, 112, 113, 115, 121, 122, 125 and 128-132 under 35 U.S.C. § 102(b) as being unpatentable over Ozkan. The Applicants respectfully disagree.

Claim 67, as amended, recites:

> receiving multiple sets of reference decoder parameters signaled for given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video;
>
> determining an operating condition using any of the multiple sets, wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video, and wherein the multiple sets are concurrently available for use in the determining the operating condition.

Claim 92, as amended, recites:

> receiving multiple sets of reference decoder parameters signaled for given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video; and
>
> processing the multiple sets, wherein the multiple sets are concurrently available for use in determination of an operating condition, and wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video.

Claim 108, as amended, recites:

> receiving a number parameter that indicates how many sets of reference decoder parameters are signaled for given video;
>
> receiving multiple sets of reference decoder parameters signaled for the given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video...; and

processing the multiple sets, wherein the multiple sets are concurrently available for use in determination of an operating condition, and wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video.

Claim 121, as amended, recites:

receiving a number parameter that indicates how many sets of reference decoder parameters are signaled for given video;

receiving multiple sets of reference decoder parameters signaled for the given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video;

determining an operating condition using any of the multiple sets, wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video, wherein the multiple sets are concurrently available for use in the determining the operating condition.

Claim 128, as amended, recites:

one or more modules for receiving multiple sets of reference decoder parameters signaled for given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video; and

one or more modules for processing the multiple sets, wherein the multiple sets are concurrently available for use in determination of an operating condition, and wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video.

Claim 132, as amended, recites:

receiving multiple sets of reference decoder parameters signaled for given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video; and

processing the multiple sets, wherein the multiple sets are concurrently available for use in determination of an operating condition, and wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video.

Ozkan fails to teach or suggest the above-cited language of claims 67, 92, 108, 121, 128 and 132, respectively, for at least the following reasons.

First, Ozkan generally relates to encoder-side control decisions. (*See* Ozkan, Figure 1, 2:57-3:21, 3:48-62, 4:63-5:8.) Based on the complexity of video in different channels, the bit rate allocator 30 in Ozkan produces quota control outputs to the respective encoders 14 for the different channels. (Ozkan, 3:48-62, 5:53-6:29.) Making encoder control decisions based on video complexity (as in Ozkan) is different than, and leads away from, the "reference decoder" language of claims 67, 92, 108, 121, 128 and 132, respectively. It is even further from teaching or suggesting "a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video," as recited in claims 67, 92, 108, 121, 128 and 132, respectively. Although Ozkan describes refining rate allocations to minimum or maximum levels imposed by an operator of a transmission link, this relates to system constraints for a transmission medium. It still does not teach or suggest the above-cited "reference decoder" language of claims 67, 92, 108, 121, 128 and 132, respectively.

Second, the Examiner appears to map the "rate parameter" and "decoder buffer size parameter" language of claims 67, 92, 108, 121, 128 and 132 to various rate allocations R and buffer size D. (Office action, page 3.) Even if this mapping were correct (and the Applicants believe it is not), the R and D values in Ozkan are used within a component of the system shown in Figure 1 of Ozkan; they are not signaled by the component or system then received. (Ozkan, 10:54-11:57.) Ozkan thus leads away from "receiving multiple sets of reference decoder parameters *signaled*" for given video, as recited in claims 67, 92, 108, 121, 128 and 132, respectively. Ozkan is even further from teaching or suggesting "receiving a number parameter that indicates how many sets of reference decoder parameters are signaled," as recited in claims 108 and 121, respectively.

Third, Ozkan describes computing a number of bits R^i allocated to a video channel *i* over a quota period, for the purpose of allocating bits between different channels depending on the complexity of different video in the different video channels. (Ozkan, 3:22-46, 8:63-9:8.) Dynamically setting a bit allocation R^i for rate control depending on video complexity (as in Ozkan) involves setting a current, actual rate target for encoding of video. This is different than and leads away from "determining an operating condition ... wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video" (as in claim 67 or 121) and "determination of an operating condition ... wherein the operating

condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video" (as in claim 92, 108, 128 or 132).

Fourth, Ozkan describes a minimum bit rate allocation R_{min} for a video channel, a maximum bit rate allocation R_{max} for the video channel and a decoder buffer size D for the video channel. (Ozkan, 10:27-67.) Even if, for the sake of argument, R_{min}, R_{max} and D were considered to be reference decoder parameters (and the Applicants believe they are not), R_{min}, R_{max} and D would constitute a single set of reference decoder parameters for video in one channel. Using a single set of reference decoder parameters for given video is different than, and leads away from, "multiple sets of reference decoder parameters" for given video, "wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter" (as in claim 67, 92, 108, 121, 128 or 132). Using a single set of reference decoder parameters for given video is also different than, and leads away from, "wherein the multiple sets are concurrently available for use in the determining the operating condition" (as in claim 67 or 121) and "wherein the multiple sets are concurrently available for use in determination of an operating condition" (as in claim 92, 121, 128 or 132).

For at least these reasons, claims 67, 92, 108, 121, 128 and 132 should be allowable.

Each of dependent claims 68-77, 80, 82-84, 89, 93-96, 99, 100, 102, 103, 105, 109, 112, 113, 115, 122, 125 and 129-131 depends directly or indirectly from, and includes the language of, claim 67, 92, 108, 121, 128 or 132. For at least the reasons explained above, these dependent claims should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

B. Claims 79, 81, 85-88, 90, 91, 97, 101, 104, 106, 107, 110, 114, 116, 124, 126 and 127.

In the Office action, the Examiner rejects dependent claims 79, 81, 85-88, 90, 91, 97, 101, 104, 106, 107, 110, 114, 116, 124, 126 and 127 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan. The Applicants respectfully disagree.

Each of claims 79, 81, 85-88, 90, 91, 97, 101, 104, 106, 107, 110, 114, 116, 124, 126 and 127 depends directly or indirectly from, and includes the language of, independent claim 67, 92, 108 or 121. For at least the reasons presented in the preceding section, these dependent claims

should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

C. Claims 78, 98, 111 and 123.

In the Office action, the Examiner rejects claims 78, 98, 111 and 123 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan in view of Morris. The Applicants respectfully disagree. Ozkan and Morris, taken separately or in combination, fail to teach or suggest at least one limitation of each of claims 78, 98, 111 and 123.

Each of claims 78, 98, 111 and 123 depends directly or indirectly from, and includes the language of, independent claim 67, 92, 108 or 121. As explained above, Ozkan does not teach or suggest the above-cited language of claims 67, 92, 108 and 121, respectively. Morris describes conversion of input data streams in MPEG-2 Transport Stream format into output data streams in MPEG-2 Program Stream format (Morris, Abstract), but also does not teach or suggest the above-cited language of claims 67, 92, 108 and 121, respectively.

For at least these reasons, claims 78, 98, 111 and 123 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

D. Claims 117-120.

In the Office action, the Examiner rejects claims 117-120 under 35 U.S.C. § 103(a) as being unpatentable over Ozkan in view of Eyuboglu. The Applicants respectfully disagree.

Claim 117, as amended, recites:

> receiving multiple sets of reference decoder parameters signaled for given video, wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter for a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video;
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> processing the multiple sets, wherein the multiple sets are concurrently available for use in determination of an operating condition, and wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video.

Ozkan and Eyuboglu, taken separately or in combination, fail to teach or suggest the above-cited language of claim 117 for at least the following reasons.

First, Ozkan generally relates to encoder-side control decisions. (*See* Ozkan, Figure 1, 2:57-3:21, 3:48-62, 4:63-5:8.) Based on the complexity of video in different channels, the bit rate allocator 30 in Ozkan produces quota control outputs to the respective encoders 14 for the different channels. (Ozkan, 3:48-62, 5:53-6:29.) Making encoder control decisions based on video complexity (as in Ozkan) is different than, and leads away from, the "reference decoder" language of claim 117. It is even further from teaching or suggesting "a reference decoder model that specifies constraints on fluctuations of a bit stream of encoded data for the given video," as recited in claim 117. Although Ozkan describes refining rate allocations to minimum or maximum levels imposed by an operator of a transmission link, this relates to system constraints for a transmission medium. It still does not teach or suggest the above-cited "reference decoder" language of claim 117.

Second, the Examiner appears to map the "rate parameter" and "decoder buffer size parameter" language of claim 117 to various rate allocations R and buffer size D. (Office action, page 6.) Even if this mapping were correct (and the Applicants believe it is not), the R and D values in Ozkan are used within a component of the system shown in Figure 1 of Ozkan; they are not signaled by the component or system then received. (Ozkan, 10:54-11:57.) Ozkan thus leads away from "receiving multiple sets of reference decoder parameters *signaled*" for given video, as recited in claim 117.

Third, Ozkan describes computing a number of bits R^i allocated to a video channel *i* over a quota period, for the purpose of allocating bits between different channels depending on the complexity of different video in the different video channels. (Ozkan, 3:22-46, 8:63-9:8.) Dynamically setting a bit allocation R^i for rate control depending on video complexity (as in Ozkan) involves setting a current, actual rate target for encoding of video. This is different than and leads away from "determination of an operating condition ... wherein the operating condition indicates peak rate or decoder buffer size for decoding the encoded data for the given video" (as in claim 117).

Fourth, Ozkan describes a minimum bit rate allocation R_{min} for a video channel, a maximum bit rate allocation R_{max} for the video channel and a decoder buffer size D for the video channel. (Ozkan, 10:27-67.) Even if, for the sake of argument, R_{min}, R_{max} and D were considered to be reference decoder parameters (and the Applicants believe they are not), R_{min}, R_{max} and D would constitute a single set of reference decoder parameters for video in one

channel. Using a single set of reference decoder parameters for given video is different than, and leads away from, "multiple sets of reference decoder parameters" for given video, "wherein each of the multiple sets comprises a rate parameter and a decoder buffer size parameter" (as in claim 117). Using a single set of reference decoder parameters for given video is also different than, and leads away from, "wherein the multiple sets are concurrently available for use in determination of an operating condition" (as in claim 117).

Eyuboglu describes transcoding a constant bit rate video bit stream to a variable bit rate video bit stream and packetizing the variable bit rate video bit stream into packets for transport over a packet-switched network (Eyuboglu, Abstract). Eyuboglu does not teach or suggest the above-cited language of claim 117.

For at least these reasons, claim 117 should be allowable.

Each of dependent claims 118-120 depends directly or indirectly from, and includes the language of, claim 117. For at least the reasons explained above, these dependent claims should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

III. Initialed Form 1449 (Page 2) for IDS Filed September 21, 2005.

The Applicants filed an Information Disclosure Statement on September 21, 2005, along with a 2-page Form 1449. The Applicants have received an initialed copy of page 1 of the Form 1449, but not page 2. Please provide an initialed copy of page 2 of the Form 1449 for the IDS filed September 21, 2005.

IV. Conclusion.

Claims 67-132 should be allowable. Such action is respectfully requested. The Examiner is invited to call the undersigned attorney at the telephone number below if the Examiner believes that doing so would further the prosecution of the present application.

Respectfully submitted,

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